WHAT IS CLAIMED IS:

1. A process for sensor obscuration analysis, implemented via a programmable machine, the process comprising:

animating a three-dimensional visualization of a satellite that includes a sensor object, the sensor object having a boresight and a sensor pattern;

selecting a view perspective from the sensor object along the boresight;

selecting objects of a satellite system analysis scenario that are capable of causing obscuration;

assigning a first color to the selected objects, while assigning a second color to unselected objects and background of the satellite system analysis scenario;

assigning a third color to the sensor pattern, such that, when the sensor pattern is superimposed over a visual display of the satellite system analysis scenario, portions of the sensor pattern that overlap with unselected objects and background appear in a different color than do portions of the sensor pattern that overlap with selected objects;

counting and recording the quantities of pixels of each color in the sensor pattern, the counting and recording being carried out at each time step of animation of the satellite system analysis scenario;

providing a graphical display to a user, during the animation, portraying the amount of obscuration of the sensor pattern, and source of obscuration of the sensor pattern, over a predetermined time period; and

calculating the percentage of obscuration over said predetermined time period on the basis of the recorded pixel quantities, the calculated percentage of obscuration being displayed to a user.

2. The process for sensor obscuration analysis of claim 1, the process further comprising:

translating a projection of the sensor pattern so that the sensor pattern is projected from edges of the sensor object.

3. The process for sensor obscuration analysis of claim 1, wherein the graphical display and the displayed calculated percentage of obscuration is used for planning missions to avoid sensing activities during periods of excessive obscuration.

4. The process of sensor obscuration analysis of claim 1, wherein the graphical display and the displayed calculated percentage of obscuration is used for planning missions to schedule maneuvers to eliminate or reduce obscuration.

5. The process of sensor obscuration analysis of claim 1, wherein the graphical display and the displayed calculated percentage of obscuration is used for the purpose of determining whether re-positioning of objects attached to the satellite can eliminate or reduce obscuration.

6. The process of sensor obscuration analysis of claim 1, wherein the counting and recording of pixels is carried out such that pixels near the edge of the sensor pattern are given a reduced weight to compensate for the fact that a display screen of the programmable machine is flat, while the sensor pattern is spherical.

7. A method of analyzing sensor obscuration using a satellite system analysis program having animated three-dimensional visualization of a satellite that includes a sensor object, the sensor object having a boresight and a sensor pattern, the method comprising:

selecting a view perspective from the sensor object along the boresight;

selecting objects of a satellite system analysis scenario that are capable of causing obscuration;

assigning a first color to the selected objects, while assigning a second color to unselected objects and background of the satellite system analysis scenario;

assigning a third color to the sensor pattern, such that, when the sensor pattern is superimposed over a visual display of the satellite system analysis scenario, portions of the sensor pattern that overlap with unselected objects and background appear in a different color than do portions of the sensor pattern that overlap with selected objects;

counting and recording the quantities of pixels of each color in the sensor pattern, the counting and recording being carried out at each time step of animation of the satellite system analysis scenario;

providing a graphical display to a user, during the animation, portraying the amount of obscuration of the sensor pattern, and source of obscuration of the sensor pattern, over a predetermined time period; and

calculating the percentage of obscuration over said predetermined time period on the basis of the recorded pixel quantities, the calculated percentage of obscuration being displayed to the user.

8. The method of analyzing sensor obscuration of claim 7, the method further comprising:

translating a projection of the sensor pattern so that the sensor pattern is projected from edges of the sensor object.

9. The method of analyzing sensor obscuration of claim 7, wherein the graphical display and the displayed calculated percentage of obscuration is used for planning missions to avoid sensing activities during periods of excessive obscuration.

10. The method of analyzing sensor obscuration of claim 7, wherein the graphical display and the displayed calculated percentage of obscuration is used for planning missions to schedule maneuvers to eliminate or reduce obscuration.

11. The method of analyzing sensor obscuration of claim 7, wherein the graphical display and the displayed calculated percentage of obscuration is used for the purpose of determining whether re-positioning of objects attached to the satellite can eliminate or reduce obscuration.

12. The method of analyzing sensor obscuration of claim 7, wherein the counting and recording of pixels is carried out such that pixels near the edge of the sensor pattern are given a reduced weight to compensate for the fact that a display screen is flat, while the sensor pattern is spherical.

13. A computer program product for enabling a computer to perform analysis of sensor obscuration, the computer program product comprising:

software instructions for enabling the computer to perform predetermined operations, and a computer readable medium embodying the software instructions;

the predetermined operations comprising:

animating a three-dimensional visualization of a satellite that includes a sensor object, the sensor object having a boresight and a sensor pattern;

selecting a view perspective from the sensor object along the boresight;

selecting objects of a satellite system analysis scenario that are capable of causing obscuration;

assigning a first color to the selected objects, while assigning a second color to unselected objects and background of the satellite system analysis scenario;

assigning a third color to the sensor pattern, such that, when the sensor pattern is superimposed over a visual display of the satellite system analysis scenario, portions of the sensor pattern that overlap with unselected objects and background appear in a different color than do portions of the sensor pattern that overlap with selected objects;

counting and recording the quantities of pixels of each color in the sensor pattern, the counting and recording being carried out at each time step of animation of the satellite system analysis scenario;

providing a graphical display to a user, during the animation, portraying the amount of obscuration of the sensor pattern, and source of obscuration of the sensor pattern, over a predetermined time period; and

calculating the percentage of obscuration over said predetermined time period on the basis of the recorded pixel quantities, the calculated percentage of obscuration being displayed to the user.

14. The computer program product of claim 13, the predetermined operations further comprising:

translating a projection of the sensor pattern so that the sensor pattern is projected from edges of the sensor object.

15. The computer program product of claim 13, wherein the graphical display and the displayed calculated percentage of obscuration is used for planning missions to avoid sensing activities during periods of excessive obscuration.

16. The computer program product of claim 13, wherein the graphical display and the displayed calculated percentage of obscuration is used for planning missions to schedule maneuvers to eliminate or reduce obscuration.

17. The computer program product of claim 13, wherein the graphical display and the displayed calculated percentage of obscuration is used for the purpose of determining whether re-positioning of objects attached to the satellite can eliminate or reduce obscuration.

18. The computer program product of claim 13, wherein the counting and recording of pixels is carried out such that pixels near the edge of the sensor pattern are given a reduced weight to compensate for the fact that a display screen of the programmable machine is flat, while the sensor pattern is spherical.

19. A sensor obscuration analysis computer program product, which has a computer program stored on a machine-readable medium, the computer program comprising:

an animation code segment providing for animated three-dimensional visualization of a spacecraft having a sensor object, the sensor object having a boresight and a sensor pattern;

a perspective selection code segment providing for a visualization view from the perspective of said sensor object, along said sensor object's boresight;

a selection code segment that enables selection of obscuring objects to be taken into account in the obscuration analysis;

a simplification code segment that simplifies visual display provided by said animation code segment to show the selected obscuring objects in a first color and show unselected objects and background in a second color;

a distinguishing code segment that assigns a third color to portions of the sensor object's field of view that are obscured by the selected obscuring objects and a fourth color to those portions of the sensor object's field of view that are not obscured, to thereby distinguish obscured portions of the sensor object's field of view from unobscured portions of the sensor object's field of view;

a quantifying code segment that counts and records a quantity of pixels corresponding to obscured portions of the sensor object's field of view at each of plural animation time steps, and that counts and records a quantity of pixels corresponding to unobscured portions of the sensor object's field of view at each of the plural animation time steps; and

a results code segment that calculates, based on the quantities of pixels counted and recorded by said quantifying code segment, and reports to a user percent obscuration of the sensor object's field of view over a predetermined time period.

20. The sensor-obscuration analysis computer program product of claim 19, the computer program further comprising:

a projection code segment that projects said sensor pattern from edges of said sensor object.

21. The sensor obscuration analysis computer program product of claim 19, said obscuring objects being selected from the group consisting of: said spacecraft, protrusions from said spacecraft, a central body about which said spacecraft orbits, and celestial bodies.

22. The sensor obscuration analysis computer program product of claim 19, said distinguishing code segment including code for determining portions of the sensor object's field of view that are obscured by the selected obscuring objects by comparing said sensor pattern with the selected obscuring objects.

23. A propagated signal for use in sensor obscuration analysis, the signal being propagated via a data transmission medium, the propagated signal comprising:

an animation signal segment providing for animated three-dimensional visualization of a spacecraft having a sensor object, the sensor object having a boresight and a sensor pattern;

a perspective selection signal segment providing for a visualization view from the perspective of said sensor object, along said sensor object's boresight;

a selection signal segment that enables selection of obscuring objects to be taken into account in the obscuration analysis;

a simplification signal segment that simplifies visual display provided by said animation code segment to show the selected obscuring objects in a first color and show unselected objects and background in a second color;

a distinguishing signal segment that assigns a third color to portions of the sensor object's field of view that are obscured by the selected obscuring objects and a fourth color to those portions of the sensor object's field of view that are not obscured, to thereby

distinguish obscured portions of the sensor object's field of view from unobscured portions of the sensor object's field of view;

a quantifying signal segment that counts and records a quantity of pixels corresponding to obscured portions of the sensor object's field of view at each of plural animation time steps, and that counts and records a quantity of pixels corresponding to unobscured portions of the sensor object's field of view at each of the plural animation time steps; and

a results signal segment that calculates, based on the quantities of pixels counted and recorded by said quantifying code segment, and reports to a user percent obscuration of the sensor object's field of view over a predetermined time period.

24. The propagated signal for use in sensor obscuration analysis of claim 23, the propagated signal further comprising:

a projection signal segment that projects said sensor pattern from edges of said sensor object.

25. A computer system adapted to analyze sensor obscuration, comprising:

a processor, and

a memory including software instructions adapted to enable the computer system to perform operations comprising:

animating a three-dimensional visualization of a satellite that includes a sensor object, the sensor object having a boresight and a sensor pattern;

selecting a view perspective from the sensor object along the boresight;

selecting objects of a satellite system analysis scenario that are capable of causing obscuration;

assigning a first color to the selected objects, while assigning a second color to unselected objects and background of the satellite system analysis scenario;

assigning a third color to the sensor pattern, such that, when the sensor pattern is superimposed over a visual display of the satellite system analysis scenario, portions of the sensor pattern that overlap with unselected objects and background appear in a different color than do portions of the sensor pattern that overlap with selected objects;

counting and recording the quantities of pixels of each color in the sensor pattern, the counting and recording being carried out at each time step of animation of the satellite system analysis scenario;

providing a graphical display to a user, during the animation, portraying the amount of obscuration of the sensor pattern, and source of obscuration of the sensor pattern, over a predetermined time period; and

calculating the percentage of obscuration over said predetermined time period on the basis of the recorded pixel quantities, the calculated percentage of obscuration being displayed to the user.

26. The computer system adapted to analyze sensor obscuration of claim 25, said software instructions included in the memory being further adapted to enable the computer system to perform operations comprising:

translating a projection of the sensor pattern so that the sensor pattern is projected from edges of the sensor object.

27. Apparatus for analyzing sensor obscuration using a satellite system analysis program having animated three-dimensional visualization of a satellite that includes a

sensor object, the sensor object having a boresight and a sensor pattern, the apparatus comprising:

means for selecting a view perspective from the sensor object along the boresight;

means for selecting objects of a satellite system analysis scenario that are capable of causing obscuration;

means for assigning a first color to the selected objects, while assigning a second color to unselected objects and background of the satellite system analysis scenario;

means for assigning a third color to the sensor pattern, such that, when the sensor pattern is superimposed over a visual display of the satellite system analysis scenario, portions of the sensor pattern that overlap with unselected objects and background appear in a different color than do portions of the sensor pattern that overlap with selected objects;

means for counting and recording the quantities of pixels of each color in the sensor pattern, the counting and recording being carried out at each time step of animation of the satellite system analysis scenario;

means for providing a graphical display to a user, during the animation, portraying the amount of obscuration of the sensor pattern, and source of obscuration of the sensor pattern, over a predetermined time period; and

means for calculating the percentage of obscuration over said predetermined time period on the basis of the recorded pixel quantities, the calculated percentage of obscuration being displayed to the user.

28. The apparatus for analyzing sensor obscuration of claim 27, further comprising:

means for translating a projection of the sensor pattern so that the sensor pattern is projected from edges of the sensor object.

29. The apparatus for analyzing sensor obscuration of claim 27, wherein said means for counting and recording of pixels operates such that pixels near the edge of the sensor pattern are given a reduced weight to compensate for the fact that a display screen is flat, while the sensor pattern is spherical.

30. A method of upgrading a satellite system analysis program that performs animated three-dimensional visualization of a satellite, the satellite having a sensor object, the sensor object having a sensor pattern and a boresight, the method comprising:

supplementing the available view perspectives for the satellite system analysis program so as to include a view from the sensor, along the boresight of the sensor;

supplementing the satellite system analysis program with a code segment that enables a user to select objects to be taken into account for analysis of obscuration of the sensor pattern as viewed along the boresight of the sensor;

supplementing the satellite system analysis program with a code segment that simplifies visual display, as viewed along the boresight of the sensor, to show selected objects in a first color and unselected objects and background in a second color;

supplementing the satellite system analysis program with a code segment that assigns colors to a representation of the sensor pattern of the sensor object, so as to distinguish those portions of the sensor object's field of view that are obscured by selected objects from those portions of the sensor object's field of view that are not obscured by selected objects;

supplementing the satellite system analysis program with a code segment that counts and records the quantity of pixels corresponding to obscured and unobscured portions of the sensor object's field of view at each of plural animation time steps; and

supplementing the satellite system analysis program with a code segment that calculates, based on recorded quantities of pixels corresponding to obscured and unobscured portions of the sensor object's field of view at each of plural animation time steps, an obscuration percentage over a predetermined time period, the results of the calculations being reported to a user.

31. The method of upgrading a satellite system analysis program of claim 30, wherein the objects to be taken into account for obscuration analysis are selected from the group consisting of: the satellite, protrusions from the spacecraft, the central body about which the satellite orbits, and celestial bodies.

32. The method of upgrading a satellite system analysis program of claim 30, the method further comprising:

supplementing the satellite system analysis program with a translation option for the sensor object that projects the sensor pattern from the edges of the sensor object.

33. A computer program product for enabling a computer to upgrade a satellite system analysis program that performs animated three-dimensional visualization of a satellite, the satellite having a sensor object, the sensor object having a sensor pattern and a boresight, the computer program product comprising:

software instructions for enabling the computer to perform predetermined operations, and a computer readable medium embodying the software instructions;

the predetermined operations comprising:

supplementing the available view perspectives for the satellite system analysis program so as to include a view from the sensor, along the boresight of the sensor;

supplementing the satellite system analysis program with a code segment that enables a user to select objects to be taken into account for analysis of obscuration of the sensor pattern as viewed along the boresight of the sensor;

supplementing the satellite system analysis program with a code segment that simplifies visual display, as viewed along the boresight of the sensor, to show selected objects in a first color and unselected objects and background in a second color;

supplementing the satellite system analysis program with a code segment that assigns colors to a representation of the sensor pattern of the sensor object, so as to distinguish those portions of the sensor object's field of view that are obscured by selected objects from those portions of the sensor object's field of view that are not obscured by selected objects;

supplementing the satellite system analysis program with a code segment that counts and records the quantity of pixels corresponding to obscured and unobscured portions of the sensor object's field of view at each of plural animation time steps; and

supplementing the satellite system analysis program with a code segment that calculates, based on recorded quantities of pixels corresponding to obscured and unobscured portions of the sensor object's field of view at each of plural animation time steps, an obscuration percentage over a predetermined time period, the results of the calculations being reported to a user.

34. The computer program product for enabling a computer to upgrade a satellite system analysis program recited in claim 33, wherein the objects to be taken into account for obscuration analysis are selected from the group consisting of: the satellite, protrusions from the spacecraft, the central body about which the satellite orbits, and celestial bodies.

35. The computer program product for enabling a computer to upgrade a satellite system analysis program recited in claim 33, the predetermined operations further comprising:

supplementing the satellite system analysis program with a translation option for the sensor object that projects the sensor pattern from the edges of the sensor object.